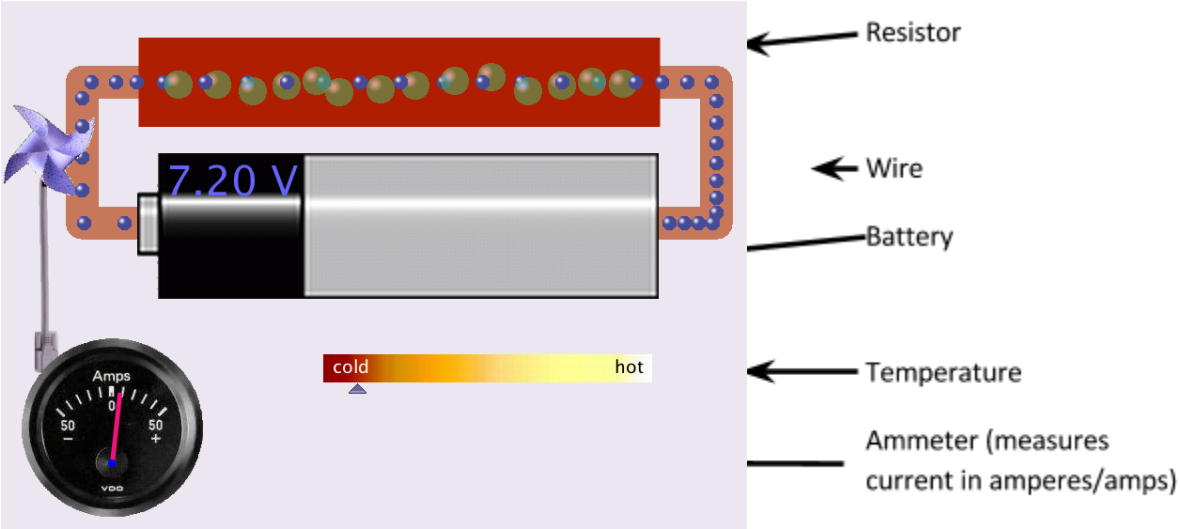
PHYSICAL SCIENCE **Name:** _____

DSHS Period ____

Exploring the Relationships Between

Resistance and Current & Voltage and Current

You can find this simulation at http://phet.colorado.edu/en/simulation/battery-resistor-circuit . If the link does not work you can search for the "Battery-Resistor Circuit" simulation.



1. Set the voltage to 7.20 V and **do not change it.** You will use the resistance values in the chart below and the ammeter in the lower left-hand corner, **estimate the current measured in amperes (amps) running through the circuit by <u>reading the dial on the ammeter</u>** and complete the chart below:

Potential Difference (voltage)	Resistance	Current
7.20 V	0.2 Ω	
7.20 V	0.4 Ω	
7.20 V	0.6 Ω	
7.20 V	0.8 Ω	

2. Describe what is happening inside the resistor as resistance is increased. (Discuss the rate at which the electrons pass through the resistor, what happened to the temperature as the resistance increased?)

3. How does increasing the resistance affect the current passing through the circuit? (As resistance goes up, what happens to the current? As resistance goes down, what happens to the current? Is this a direct or indirect relationship?)

4. If we continued with the water tower analogy from earlier this week, what would be true about the water tower in all of these situations? (Discuss height and holding capacity of the top of the tower)

5. What would be true about the size of the hose from which water exited the tower? (Discuss hose size and the ease of the waters flow as you moved from a resistance of 0.2 to 0.8 Ω)

6. Current is measured in Amperes, or Coulombs per second. Coulombs per second is the amount of charge which passes through the circuit each second. If there is low resistance, what can you say about the amount of charge that passes through the circuit per second compared to if there is high resistance?

7) Set the resistance on this circuit to 0.6 Ω **and do not change it**. Start at 6 V and incrementally decrease the voltage for the 6 trials below (ending at 0 V). Fill in the chart below as you complete this exercise.

Potential Difference (voltage)	Resistance	Current
6 V	0.6 Ω	
4.56 V	0.6 Ω	
3.6 V	0.6 Ω	
2.4 V	0.6 Ω	
1.2 V	0.6 Ω	
0 V	0.6 Ω	

8. Describe what is happening inside the resistor as the voltage is decreased. (Discuss the rate at which the electrons pass through the resistor, what happened to the temperature as the resistance decreased?)

9. How does decreasing the potential difference or voltage affect the current passing through the circuit? (As voltage goes down, what happens to the current? As voltage goes up, what happens to the current? Is this a direct or indirect relationship?)

10. If we continued with the water tower analogy from earlier this week, what would be true about the water tower as we move from the top of the table to the bottom, from 6V to 0 V? (Discuss height and holding capacity of the top of the tower)

11. What would be true about the size of the hose from which water exited the tower? (Discuss the hose size and the ease of the waters flow from the hose as you move from 6V to 0 V)

12. In this lab, the battery is our power source. What then does the battery provide to the circuit?

13. The battery provides electrical potential energy to the system by undergoing chemical reactions, what is electrical potential energy measured in?